I. H. Burkill in Malaya

C. X. FURTADO AND R. E. HOLTTUM

ONLY A FEW years ago there was discussed in the *Gardens' Bulletin* the extensive pioneer work done by the late Mr. H. N. Ridley not only in showing that *Hevea brasiliensis* could be grown in Asia for the commercial production of rubber but also in laying stable foundations for the development of the several scientific departments for investigating the problems connected with fauna, flora, agriculture and forestry of Malaya. In view of this great work by Mr. Ridley, it might seem that his successor, Mr. Isaac Henry Burkill, would have little to do but follow on established lines. However, though we may not be able to do full justice to the subject, there are weighty reasons to consider the work of Mr. Burkill quite unique in its way; and it was work carried out, like Ridley's under many difficulties.

When Ridley retired from the service in 1912 and even before Burkill took the charge of the Gardens Department, the different departments which Ridley had helped to found, dissociated their connection with the Gardens' Department in order to work entirely as independent units in Malaya. Then the World War I (1914–1918) rendered impossible the execution of several projects because of the difficulties of recruiting properly trained staff, also because of lack of funds. Further, though the agricultural and the forestry departments were mainly for the Malay States, they had jurisdiction over the agricultural and forestry sections in the Straits Settlements, while the authority of the Gardens' Department was restricted to the official gardens within the Straits Settlements, so that the Gardens in the Malay States were placed under the Malayan Agricultural Departments. Difficulties in the Straits Settlements were mounting not only owing to lack of staff and finance but also to lack of appreciation of the value of purely botanical work; and perhaps this is the main reason why, soon after World War I, the area in which the arboretum was established and a good deal of acclimatisation work was being done on fruit trees and other economic plants and where rubber industry was born was taken away from the Gardens Department in order to establish Raffles College—the precursor of the University of Malaya, Faculties of Arts and Science.

But Burkill came here with an experience in India, where at the time, because of the limited availability of trained staff, one had to use one's skill to make a scientific undertaking a success. A rapid survey must have shown to Burkill that, if the Gardens' Department was to survive, it must become a centre for research of systematic botany; and for this purpose the first thing needed was to re-organise the whole herbarium and library so as to become less dependent on the workers and herbaria in India and England. Hitherto Ridley had worked in co-operation with the different specialists in India, England, Italy and Germany. The correspondence and his visits to Europe had helped him to describe his many new species and genera and write several papers. This extensive work had not given him time to organise adequately the herbarium and the library in Singapore; and perhaps because of the danger of termites and other vermin important specimens or types were sent to the workers in Kew, Calcutta and elsewhere, so that Singapore lacked many of the types or authentic material from Ridley's own collections. Further, since many specimens in the herbarium had no identifications written on their labels even when sorted, they were liable to be misplaced in the course of using the herbarium or mending the sheets. When working the *Flora of the Malay Peninsula* I–V (1922–25) Ridley used mainly the duplicate specimens he had sent to Kew, so that most of the specimens in the Singapore Herbarium still remained unlabelled.

Burkill therefore set himself immediately to the task of naming the specimens and indicating appropriately those cited in the large floristic works on Malaya, *The Materials for a Flora of the Malayan Peninsula: Dicotyledons* Vols. I–V by King and later assisted and continued by Gamble (1889–1915) and *Monocotyledons* by Ridley, *Vols. I–III (1907),* and later in Ridley's *Flora of the Malay Peninsula* I–V (1922–25). Further he organised collection trips to Malaya, Sumatra, Java and Sarawak in order to enrich the Singapore herbarium and also to send duplicate specimens to other institutions, so that such duplicates might be compared with types or authentic material in other institutions. Thus about 20,000 specimens were added by way of the collection in the jungles, the duplicates of which were distributed to several herbaria interested in Malaysian systematics and almost an equal number was received in exchange or as gifts, in addition to acquiring a set of Elmer's collection in Borneo and the Philippines. Further several hundreds of specimens of the plants cultivated in the Gardens were made in order to form a herbarium of the Gardens' plants.

It was at this time that Burkill introduced the system of numbering the specimens in the field rather than in the herbarium; for when numbered in the field, one can be sure that the different specimens bearing the same number are from the same collection, whereas, when numbered in the herbarium, specimens from different collections sometimes become mixed together so that the duplicates bearing the same number may not be specifically or varietally identical. The system of numbering the specimens in the field seemed to be so interesting that many foreign botanists who visited the Singapore herbarium often begged a specimen field label to take away with them for adapting it to their conditions.

It was in the course of this re-organization of the herbarium and the library that Burkill laid the foundation for his monumental work, *A Dictionary of the Economic Products of the Malay Peninsula* 2 vols. 2402 pp., elaborated and published in 1935, after his retirement in England. The work of re-organizing the herbarium provided also vernacular names and some information which had to be completed by making a further inquiry among the local people and by consulting the reports of research workers in Malaya, Indonesia, Philippines, India and elsewhere on the plants found in Malaya. The results thus collated were no doubt later incorporated in the Dictionary, but sometimes they formed the subject of special papers in the *Gardens' Bulletin.* Thus Burkill compiled a list of all the persons who had contributed specimens to the Gardens' Herbarium with details of their travels, and this together with the names of other persons who had contributed Malayan plants to other herbaria in the world, formed the subject of a paper with biographical sketches of the collectors published in the *Gardens Bulletin* IV (1927) 113–202, with the following title: *Botanical Collectors, Collections and Collecting Places in the Malay Peninsula: A review of the work so far done towards a knowledge of plantgeography of Malaya.* An inquiry into the simples and crude drugs of Malaya led Burkill to enlist the co-operation of the authorities who could competently work out the collections or manuscripts studied by him. Thus the specimens of Chinese drugs collected by Burkill were worked out by David Hooper and published in *Gardens' Bulletin* Vol. VI Part 1 (1929) 1–163. The prescriptions collected from the Malays by Burkill and Mohammed Haniff were issued as "*Malay Village Medicine*" the Malay names being associated with the botanical names of the plants by Burkill himself, and issued in *Gardens' Bulletin* VI (1930) 165–321. The manuscript book of *"The Medical Book of Malayan Medicine"*, translated by Inche Ismail Munshi, possibly in Penang circa 1886, was edited by Burkill who gave the botanical determination of the plants, while medical notes were supplied by J. D. Gimlette, who had worked widely on the Malayan medical terminology. (Gard. Bull. VI, 1930 pp. 323–474).

The undertaking to write an account about the Economic Products of Malaya led Burkill to make a survey of the efforts made to acclimatize foreign plants in Malaya. This involved not only culling information from the different published reports but also noting and sorting out the old manuscript records of every plant or seed that was introduced in the Botanic Gardens, which was generally the place to which plants newly introduced into Malaya were sent. The records were classified and made accessible in the herbarium under their respective genus and thence were worked out for the Dictionary.

The inquiry as to success or failure of the introduced plants necessitated a census of all the plants that existed in the Botanic Gardens and in its economic section which is now extinct. Thus the herbarium of the plants in cultivation came into the existence providing often valuable information of the success of plants that were introduced and cultivated in Malaya. Since there were then separate agricultural and forestry departments, the library exchanges and purchases had to be revised so as to make the institution more useful for its specialized purpose of the study of systematic botany. At the same time the Gardens' periodical which had hitherto been *The Agricultural Bulletin of the Straits and Federated Malay States,* was continued with the changed title *"The Gardens' Bulletin, Straits Settlements"*. This change in the title was also necessary since the Malayan Agricultural Department had started a new periodical called *"The Agricultural Bulletin of the Federated Malay States"*, causing thereby much confusion among the foreign public who, at the time, knew very little of Malayan geography and much less of Malayan political divisions.

The development of the Gardens' Department as the systematic centre for Malayan botany and the difficulties of enlisting the services of the botanical institutions in India and England, then suffering from shortage of staff, soon showed that several aspects of research work in the Malayan departments concerned with forestry, agriculture, rubber, malaria, food-stuffs of man and animals, and other subjects could not be carried on without making frequent calls upon the services of the Gardens' Department. An attempt was therefore made to establish a separate systematic research centre in Perak using Wray's herbarium as the basis, but it proved a failure, because no systematist can provide the services needed by research institutions without a properly organized herbarium and library. Even police cases can be delayed or be misdirected if plants suspected as poisons are not properly identified.

While continuing to co-operate, so far as he was able, with the Malayan Departments of Agriculture and Forestry, Burkill opposed proposals for union of the Botanic Gardens, S.S., with either of these departments. He further insisted on the importance of a herbarium being associated with a garden, where plants could be studied in cultivation, as well as on the necessity of ample opportunity for field study of native plants. When the Research division of the Forestry Department was established, it became evident that that Department was dependent on the herbarium at the Botanic Gardens for a great amount of important information concerning the forest plants of Malaya. Dr. F. W. Foxworthy, the first Forest Research Officer, made frequent visits to Singapore, and collaborated in a study of the seedlings of Dipterocarps which Burkill had started: cf. Journ. Str. Br. Roy. Asiat. Soc. 75 (1917) 43–48; 76 (1917) 161–167; 79 (1918) 39–44; 81 (1920) 1–4 and 49–76; 86 (1922) 281–284 and 285–291; Journ. Malay. Br. Roy. Asiat. Soc. I (1923) 218–222, and with Foxworthy in Journ. Str. Br. Roy. Asiat. Soc. 86 (1922) 271–280.

A proposal was made for the moving of the headquarters of the Gardens Department to Kuala Lumpur, in order that it might be closely associated with the Forest Research Institute (with the possibility of a common library of books and journals on plant taxonomy), and about the time of Burkill's retirement a committee was appointed to make a recommendations to effect this change. But, though there was agreement in principle as to the desirability of the committee's proposals, the Federal Government decided that the cost of new buildings would be too great, and the matter was shelved, later to be completely abandoned; and the Straits Settlements continued to bear the whole cost of what was in effect a Malayan botanical service. The effectiveness of this service was increased during the last years of Burkill's directorship by the addition of two plant taxonomists and one graduate field officer (Holttum, Henderson and Furtado respectively) and a library assistant to the Gardens staff.

Though working under a great handicap, Burkill showed how a trained botanist can use his time in making systematic and biological observations on the many plants that are grown in a garden and also utilize the facilities available for growing plants to clear certain doubts regarding their botanical affinities, dietetic value, etc. Thus the first two or three volumes of the Gardens' Bulletin contain a large number of notes regarding insect pests, abnormalities, new varieties of orchids, flowering peculiarities of many plants growing in the Gardens, digests of old records on rubber and on the history of the Gardens in Malaya, and observations on the Yams (Dioscorea spp.) grown in the Gardens where he had gathered them from different parts of the world in order to prosecute his studies begun in Calcutta in the company of Dr. (later Sir) David Prain. The following articles might be mentioned since they show the keenness and the breadth of the studies: *"The Positions of the Agricultural Industries in the Straits Settlements in 1913"* (Gard. Bull. I, 1914 pp. 213–235); *"The Treatment to which the Para-Rubber Trees of the Botanic Gardens, Singapore, have been subjected"* (Gard. Bull. I, 1915, pp. 248–295); *"Gordonia"* (Journ. Str. Br. Roy. Asiat. Soc. 76 (1917) 133–159); *"The Establishment of the Botanic Gardens, Singapore"* (Gard. Bull. II, 1918, pp. 55–72); *"The Second Phase in the History of the Botanic Gardens, Singapore"* (Gard. Bull. II, 1918 pp. 93–108); *"The Composition of a Piece of Well-drained Singapore Secondary Jungle Thirty Years Old"* (Gard. Bull. II, 1919 pp. 145–157); *"Some Notes on the Pollination of Flowers in the Botanic Gardens, Singapore, and in other Parts of the Peninsula"* (Gard. Bull. II, 1919 pp. 165–176); *"The Genus Gordonia in the Philippine Islands"* (Philipp. Journ. Sci. XV, 1919 pp. 475–478); *"A List of Oriental Vernacular Names of the Genus Dioscorea"* (Gard. Bull. II, 1924 pp. 121–244).

However Burkill was only for a short space of 13 years in Malaya; and during this period he was busy collecting material for his monumental work of *"A Dictionary of the Economic Products of the Malay Peninsula"*. Naturally these notes and observations had to be worked out in England where he had an access to better library and herbarium facilities and whence he helped, after his retirement, the Gardens' Herbarium to name many of the foreign and other plants that were grown in the Gardens. Each of his articles in the Dictionary is replete with information about the history of the plant, its products, vernacular names, uses, chemical composition of the drug or poison if known, etc. In addition to work on the Dictionary, other studies begun in Singapore or Calcutta were completed in England. Thus *"An Account of the genus Dioscorea in the East"* was published by Prain and Burkill in four large volumes (two of which are plates), in the *Annals of the Botanic Gardens, Calcutta* in 1937 and 1939. The following papers might also be mentioned: *"The Chinese Mustards in the Malay Peninsula"* (Gard. Bull. V, 1930 pp. 99–117); *"An Enumeration of the Species of Paramignya, Atalantia and Citrus, found in Malaya"* (Gard. Bull. V, 1931 pp. 212–223); *"Notes on Gluta"* (Gard. Bull. V, 1931 pp. 224–230); *"The rise and decline of the Greater Yam in the service of man"* (Avanc. Sci. Lond. VII 1950 pp. 443–448).

Also it may be noted that in addition to many species, at least three genera have been named in honour of Mr. I. H. Burkill, namely, *Burkillia,* West and West, Protococcaceae (1907), *Burkillia* Ridley, Leguminoseae (1925) and *Burkillianthus* Swingle, Rutaceae (1938).